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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,613	07/30/2003	Ming Zheng	CL2191US NA	3957

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EXAMINER	
FORMAN, BETTY J	
ART UNIT	PAPER NUMBER
1634	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/630,613	ZHENG ET AL.	
	Examiner	Art Unit	
	BJ Forman	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) *1-19* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20-31* is/are rejected.

7)☒ Claim(s) *20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FINAL ACTION

Status of the Claims

1. This action is in response to papers filed 1 August 2006 in which claims 20, 28 and 30 were amended. The amendments have been thoroughly reviewed and entered.

The previous rejections in the Office Action dated 12 April 2006 under 35 U.S.C. 112, second paragraph are withdrawn in view of the amendments. The previous rejections under 35 U.S.C. 102(b) and (e) are maintained as discussed below. Applicant's arguments have been thoroughly reviewed and are discussed below. New grounds for rejection, necessitated by the amendments, are discussed.

Claims 20-31 are under prosecution.

Claim Objections

2. Claim 20 objected to because of the following informalities: The claim contains an extraneous sequence of words after the period ending the previously examined claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 20-28, 30-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Mirkin et al (U.S. Patent No. 6,361,944, filed 25 June 1999).

Regarding Claim 20, Mirkin et al disclose a geometric nanostructure comprising at least three complexes in a spatially arranged and ordered pattern (Fig. 25, Example 17, Column 65, lines 9-16), the complexes comprising a nanoparticle (Abstract) and a single ligand (i.e. a single type of ligand/particle, Fig. 25), wherein the ligand has a proximal portion attached to the nanoparticle (i.e. functional group at the terminal end of the oligo, Column 17, lines 15-67) and a distal portion (e.g. nucleic acid sequence) wherein the complexes are each affixed to each other through the distal portion (e.g. via hybridization and aggregation as illustrated in Fig. 5 and 25B).

Regarding Claim 21, Mirkin et al disclose the nanoparticle having a diameter of 2 to 10 nm (i.e. "about 5nm", Column 16, lines 36-38).

Regarding Claim 22, Mirkin et al disclose the nanoparticle is comprised of metals or semiconductors (Column 16, lines 40-42).

Regarding Claims 23-24, Mirkin et al disclose the nanostructure wherein the ligand is nucleic acid or peptide nucleic acid (Column 42, lines 15-30).

Regarding Claim 25, Mirkin et al disclose the nanostructure wherein the ligand is derivatized to include a functional group at the distal end (e.g. hydrophobic group, Column 3, lines 37-42) or (e.g. labels, Column 6, lines 29-36).

Regarding Claim 26, Mirkin et al disclose the nanostructure wherein the functional group is a NH2 C7 (Column 58, lines 38-62).

Regarding Claim 27, Mirkin et al disclose the nanostructure wherein the ligand is a nucleic acid and the complexes are affixed by hybridization of distal portions of the nucleic acid (i.e. via hybridization and aggregation as illustrated in Fig. 5 and 25B).

Regarding Claim 28, Mirkin et al disclose the nanostructure of Claim 20 wherein the ligand (nucleic acid) has a functional group that is a first member of a binding pair and wherein the complexes are affixed to a second member of the binding pair (i.e. the first member is the distal nucleic acid sequence wherein hybridization to the complementary sequence (i.e. the second member of the binding pair) affixes the complexes (i.e. via hybridization and aggregation as illustrated in Fig. 5 and 25B).

Regarding Claim 30, Mirkin et al disclose a geometric nanostructure comprising at least two complexes in a spatially arranged and ordered pattern (Fig. 25, Example 17, Column 65, lines 9-16), the complexes comprising a nanoparticle (Abstract) and a single ligand (i.e. a single type of ligand/particle, Fig. 25), wherein the ligand has a proximal portion attached to the nanoparticle (i.e. functional group at the terminal end of the oligo, Column 17, lines 15-67) and a distal portion (e.g. nucleic acid sequence) wherein the complexes are each affixed to each other through the distal portion (e.g. via hybridization and aggregation as illustrated in Fig. 5 and 25B) and wherein the complexes take the form of mixtures of dimers , trimers or tetramers (Fig. 25).

Regarding Claim 31, Mirkin et al disclose the nanoparticle having a diameter of 2 to 10 nm (i.e. "about 5nm", Column 16, lines 36-38).

Response to Arguments

5. Applicant asserts that Mirkin teaches only a matrix of complexes but is silent regarding spatially arranged nanoparticles. Applicant further asserts that Fig 25 of Mirkin illustrates a disordered aggregate and the discussion of the figure makes no mention of di-mers or tri-mers. The argument has been considered but is not found persuasive because Mirkin specifically exemplifies "periodic structure" (Column 65, lines 14-16). While Mirkin uses the term

"aggregate", Mirkin defines the aggregates as "ordered" (Column 14, lines 15-16, Column 46, lines 14-18). The claims require "ordered" particles. Mirkin specifically teaches "ordered" particles and therefore anticipates the claimed structures.

Applicant further asserts that Mirkin does not teach the di-mer or tri-mers as described in the instant specification. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., di-mers and tri-mers) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant further asserts that Mirkin only teaches multiple ligands on each particle and does not teach methods for isolating particles having a single ligand attached. The argument has been considered but is not found persuasive because the claims require a "single ligand". Mirkin teaches a single ligand (e.g. ligand "c" as ill rated in Fig. 25B). Hence, Mirkin specifically teaches a single type of ligand attached to the particle. Applicant appears to be asserting that the claims are limited to a single molecule of a single ligand. However, the claims are not so limited. The instant claims define a particle as "comprising" a single ligand. The open claim language "comprising" encompasses additional elements and/or copies of the single ligand. Therefore Mirkin anticipates the structure as claimed.1

6. Claims 20-31 are rejected under 35 U.S.C. 102(b) as being anticipated by Barbera-Guillem et al (U.S. Patent No. 6,261,779, issued 17 July 2001).

Regarding Claim 20, Barbera-Guillem et al disclose a geometric nanostructure comprising at least three complexes spatially arranged n an ordered geometric pattern (e.g. 3-D, Column 8, lines 61-65), the complexes comprising a nanoparticle (Abstract) and a single ligand (multiple copies of the same ligand, e.g. Fig. 3), wherein the ligand has a proximal

portion attached to the nanoparticle (i.e. the nanocrystal is linked to the polynucleotide, Column 5, line 63-Column 6, line 62 and Example 2) and a distal portion (e.g. nucleic acid sequence) wherein the complexes are each affixed to each other through the distal portion (e.g. via hybridization to form a dendrimer as illustrated in Fig. 3-8).

Regarding Claim 21, Barbera-Guillem et al disclose the nanoparticle having a diameter of 2 to 10 nm (Column 10, lines 15-17).

Regarding Claim 22, Barbera-Guillem et al disclose the nanoparticle is comprised of metals or semiconductors (Column 10, lines 18-25).

Regarding Claim 23, Barbera-Guillem et al disclose the nanostructure wherein the ligand is a protein, nucleic acid, peptide nucleic acid or oligomer (Column 4, lines 4-20).

Regarding Claim 24, Barbera-Guillem et al disclose the nanostructure wherein the ligand is nucleic acid or peptide nucleic acid (Column 4, lines 10-15).

Regarding Claim 25, Barbera-Guillem et al disclose the nanostructure wherein the ligand is derivatized to include a functional group at the distal end (Column 17, lines 29-66).

Regarding Claim 26, Barbera-Guillem et al disclose the nanostructure wherein the functional group is a NH2 with 1-12 carbon, thiol groups with 1-12 carbon, biotin group with 1-12 carbon i.e. the free ends are capped using one of many functional groups (Column 8, lines 11-32; Column 17, lines 29-66; and Column 18, line 44-Column 19, line 22).

Regarding Claim 27, Barbera-Guillem et al disclose the nanostructure wherein the ligand is a nucleic acid and the complexes are affixed by hybridization of distal portions of the nucleic acid (as illustrated in Fig. 3-8).

Regarding Claims 28-29, Barbera-Guillem et al disclose the nanostructure of Claim 20 wherein the ligand (nucleic acid) has a functional group that is a first member of a binding pair (e.g. biotin) and wherein the complexes are affixed to a second member of the binding pair (e.g. avidin) (Column 17, lines 29-66).

Regarding Claim 30, Barbera-Guillem et al disclose a geometric nanostructure comprising at least three complexes, the complexes comprising a nanoparticle (Abstract) and a ligand, wherein the ligand has a proximal portion attached to the nanoparticle (i.e. the nanocrystal is linked to the polynucleotide, Column 5, line 63-Column 6, line 62 and Example 2) and a distal portion (e.g. nucleic acid sequence) wherein the complexes are each affixed to each other through the distal portion (e.g. via hybridization to form a dendrimer as illustrated in Fig. 3-8) and wherein the complexes take the form of mixtures of dimers , trimers or tetramers (Fig. 3-8).

Regarding Claim 31, Barbera-Guillem et al disclose the nanoparticle having a diameter of 2 to 10 nm (Column 10, lines 15-17).

Response to Arguments

7. Applicant asserts that similar to Mirkin, Barbera-Guillem teaches only a matrix of complexes but is silent regarding spatially arranged nanoparticles and single ligands attached to the particles. The arguments have been considered but are not found persuasive for reasons similar to those above e.g. the open claim language "comprising" encompasses additional copies of a single ligand and/or elements. Furthermore, Barbera-Guillem specifically teaches ordered structures e.g. 3-D dendrimers (Column 8, lines 61-62). Hence, Barbera-Guillem anticipates the claims as written.

NEW GROUNDS OF REJECTION

8. These new rejections are based on Applicant's interpretation of the amended claims. As stated above, the Office disagrees with Applicant's interpretation. However, in the interest of furthering prosecution, the new grounds are made of record.

9. Claims 20-31 are rejected under 35 U.S.C. 102(a)/(b) as being anticipated by Niemeyer et al (Chembiochem, 2001, 260-264).

This reference was supplied by Applicant in the IDS of November 2003. The only date provided on the IDS was the year i.e. 2001. Depending on the month of publication, the

reference is either a 102 (a) or 102(b) reference. Because the month of publication is not known by the Office, the reference is rejected under both 102 (a) and 102(b).

Regarding Claim 20, Niemeyer et al disclose a geometric nanostructure comprising at least three complexes spatially arranged n an ordered geometric pattern (Fig. 1, 4 and 5), the complexes comprising a nanoparticle (Abstract) and a single ligand (DNA:STV is 3:2, providing at least some STV with a single copy of a single ligand, page 263, right column, first full paragraph), wherein the ligand has a proximal portion attached to the nanoparticle and a distal portion wherein the complexes are each affixed to each other through the distal portion (Fig. 1, 4-5 and accompanying text).

Regarding Claim 21, Niemeyer et al disclose the nanoparticle having a diameter of 2 to 10 nm (page 261, right column, first full paragraph).

Regarding Claim 22, Niemeyer et al disclose the nanoparticle is comprised of metals or semiconductors (page 261, right column, first full paragraph).

Regarding Claim 23, Niemeyer et al disclose the nanostructure wherein the ligand is a protein, nucleic acid, peptide nucleic acid or oligomer (Fig. 1,4-5).

Regarding Claim 24, Niemeyer et al disclose the nanostructure wherein the ligand is nucleic acid or peptide nucleic acid (Fig. 1, 4-5).

Regarding Claim 25, Neimeyer et al disclose the nanostructure wherein the ligand is derivatized to include a functional group at the distal end (page 263, right column, first full paragraph).

Regarding Claim 26, Niemeyer et al disclose the nanostructure wherein the functional group is a NH2 with 1-12 carbon, thiol groups with 1-12 carbon, biotin group with 1-12 carbon i.e. the free ends are capped using one of many functional groups (page 263, right column, first full paragraph).

Regarding Claim 27, Niemeyer et al disclose the nanostructure wherein the ligand is a nucleic acid and the complexes are affixed by hybridization of distal portions of the nucleic acid (as illustrated in Fig. 1, 4-5).

Regarding Claims 28-29, Niemeyer et al disclose the nanostructure of Claim 20 wherein the ligand (nucleic acid) has a functional group that is a first member of a binding pair (e.g. biotin) and wherein the complexes are affixed to a second member of the binding pair (page 263, right column, first full paragraph).

Regarding Claim 30, Niemeyer et al disclose a geometric nanostructure comprising at least two complexes spatially arranged n an ordered geometric pattern (Fig. 1, 4 and 5), the complexes comprising a nanoparticle (Abstract) and a single ligand (DNA:STV is 3:2, providing at least some STV with a single copy of a single ligand, page 263, right column, first full paragraph), wherein the ligand has a proximal portion attached to the nanoparticle and a distal portion wherein the complexes are each affixed to each other through the distal portion (Fig. 1, 4-5 and accompanying text).

Regarding Claim 31, Niemeyer et al disclose the nanoparticle having a diameter of 2 to 10 nm (page 261, right column, first full paragraph).

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

11. No claim is allowed.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (571) 272-0741. The examiner can normally be reached on 6:00 TO 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla can be reached on (571) 272-0735. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

BJ Forman, Ph.D.
Primary Examiner
Art Unit: 1634
September 27, 2006